LISTING OF THE CLAIMS:

Claim 1 (Cancelled).

2. (Currently Amended) A method of imaging a biological sample, comprising the steps of:

generating an initial ultrasonic signal;

directing the ultrasonic signal into and along a propagation path in the sample, wherein the sample causes finite, non-linear amplitude distortion of the ultrasonic signal along the propagation path and thereby produces a distorted ultrasonic signal comprised of a first order component signal and higher order harmonic component signals at a first and higher order harmonic frequencies respectively, and further wherein the sample also reflects the distorted ultrasonic signal including the first order and the higher order harmonic components ~~ultrasonic~~;

receiving the higher order harmonic components of the reflected distorted ultrasonic signal produced by the distortion of the initial ultrasonic signal along the propagation path and caused by said sample;

forming an image principally from one of said received higher order harmonic components of the reflected distorted ultrasonic signal; and

displaying said formed image.

3. (Original) A method according to Claim 2, wherein the removing step includes the step of high-pass filtering the received, reflected distorted signal to remove therefrom the first order component thereof.

4. (Original) A method according to Claim 2, wherein:

the generating signal includes the steps of generating first and second ultrasonic signals;

the directing step includes the steps of directing the first and second ultrasonic signals into the sample;

the receiving step includes the step of receiving any first and second signals reflected and distorted by said sample;

the forming step includes the steps of

i) subtracting the received second distorted signal from the received first distorted signal to produce a resultant signal, and

ii) forming the image from said resultant signal.

5. (Original) A method according to Claim 4, wherein the first and second signals are identical except that one is scaled up in magnitude by a factor x (greater than 1) relative to the other and the second signal is transmitted after the reception of the distorted first signal.

6. (Original) A method according to Claim 5, wherein the sample (i) distorts the first ultrasonic signal to produce a first distorted signal, (ii) reflects the first distorted signal, (iii) distorts the second ultrasonic signal to produce a second distorted signal, and (iv) reflects the second distorted signal.

7. (Original) A method according to Claim 6, wherein the forming step includes the step of:

scaling the smaller received distorted signal (corresponding to the unscaled transmitted signal) by the previously used scale factor x;

next subtracting this scaled signal to produce a difference signal essentially without frequency content in the original transmitted bandwidth; and

forming the image from one of said higher order component signals of the difference signal.

Claims 8-12 (Cancelled).

13. (Previously Presented) A system for imaging a biological sample, comprising:

means for generating an initial ultrasonic signal;

means for directing the initial ultrasonic signal into and along a propagation path in the sample, wherein the sample causes finite, non-linear amplitude distortion of the fundamental signal along the propagation path, and said distortion produces a distorted ultrasonic signal comprised of a first order component and higher order harmonic components

at a first and higher order harmonic frequencies respectively, and wherein the sample also reflects the distorted ultrasonic signal including the first order and the higher order harmonic components thereof;

means for receiving the higher order harmonic components of the reflected distorted ultrasonic signal produced by the distortion of the initial ultrasonic signal along the propagation path and caused by said sample;

means for forming an image principally from one of said received higher order harmonic component signals of the reflected distorted ultrasonic signal; and

means for displaying said formed image.

14. (Original) A system according to Claim 13, wherein the means for removing the first order component from the received distorted signal includes a high-pass filter to filter the received, reflected distorted signal to remove therefrom the first order component thereof.

15. (Original) A system according to Claim 13, wherein:

the means for generating the ultrasonic signal includes means for generating first and second ultrasonic signals;

the means for directing the ultrasonic signal into the sample includes means for directing the first and second ultrasonic signals into the sample;

the receiving means includes means for receiving any first and second signals reflected and distorted by said sample;

the means for forming the image includes

i) means for subtracting the received second distorted signal from the received first distorted signal to produce a resultant signal, and

ii) means for forming the image from said resultant signal.

16. (Original) A system according to Claim 15, wherein the first and second signals are identical except that one is scaled up in magnitude by a factor x (greater than 1) relative to the other and the second signal is transmitted after the reception of the distorted first signal.

17. (Original) A system according to Claim 16, wherein the sample (i) distorts the first ultrasonic signal to produce a first distorted signal, (ii) reflects the first distorted signal, (iii) distorts the second ultrasonic signal to produce a second distorted signal, and (iv) reflects the second distorted signal.

18. (Original) A system according to Claim 16, wherein the forming means includes:

means for scaling the smaller received distorted signal (corresponding to the unscaled transmitted signal) by the previously used scale factor x; and

next for subtracting this scaled signal to produce a difference signal essentially without frequency content in the original transmitted bandwidth; and

means for forming the image from one of said higher order component signals of the difference signal.

Claims 19-28 (Cancelled).

29. (Previously Presented) A method according to Claim 2 wherein:

the higher order harmonic component signals include a second order harmonic component and further, higher order components; and

the forming step includes the step of forming the image principally from the second order component of the received reflected distorted ultrasonic signal.

30. (Previously Presented) A method according to Claim 2, further including the step of maintaining the sample substantially free of any contrast agent while directing the initial ultrasonic signal into and along the propagation path in the sample.

31. (Previously Presented) A method according to Claim 2, wherein:

the generating step includes the step of generating a series of ultrasonic pulse signals; and

the directing step includes the step of directing the series of ultrasonic pulse signals into and along the propagation path in the sample.

32. (Previously Presented) A method according to Claim 2, wherein the sample linearly reflects the distorted ultrasonic signal produced by the distortion of the initial ultrasonic signal along the propagation path and caused by the sample.

33. (Previously Presented) A system according to Claim 13, wherein:

the higher order harmonic components include a second order harmonic component and further, higher order harmonic components; and

the forming means includes means for forming the image principally from the second order harmonic component of the received reflected distorted ultrasonic signal.

34. (Previously Presented) A system according to Claim 13, for use with a sample that is substantially free of contrast agent while the initial ultrasonic signal is directed into and along the propagation path.

35. (Previously Presented) A system according to Claim 13, wherein:

the generating means includes means to generate a series of ultrasonic pulse signals; and

the directing means includes means to direct the series of ultrasonic pulse signals into and along the propagation path in the sample.

36. (Previously Presented) A system according to Claim 13, wherein the sample linearly reflects the distorted ultrasonic signal produced by the distortion of the initial ultrasonic signal along the propagation path and caused by the sample.

37. (New) A method of imaging a biological sample, comprising the steps of:

generating a transmit ultrasonic signal, said transmit signal being at a fundamental frequency and having negligible energy in the second harmonic bandwidth of the fundamental frequency;

directing the transmit ultrasonic signal into and along a propagation path in the sample, wherein the sample causes finite, non-linear amplitude distortion of the transmit signal along the propagation path and thereby produces a distorted ultrasonic signal comprised of a first order component signal and higher order harmonic component signals at a first and higher order harmonic frequencies respectively, and further wherein the sample also reflects the distorted ultrasonic signal including the first order and the higher order harmonic component signals;

receiving the higher order harmonic components of the reflected distorted ultrasonic signal produced by the distortion of the input ultrasonic signal along the propagation path and caused by said sample;

forming an image principally from one of said received higher order harmonic component signals of the reflected distorted ultrasonic signal; and

displaying said formed image.

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38. (New) A method according to Claim 37, wherein the step of forming an image includes the steps of:

digitizing the received components; and

using a processor to process the digitized components to produce an image principally from one of the received harmonic components of the reflected distorted ultrasonic signal.

39. (New) A method according to Claim 38, further comprising the step of high pass filtering the received harmonic components of the reflected, distorted ultrasonic signal.

40. (New) A method according to Claim 39, where the high pass filtering step occurs before the digitizing step.

41. (New) A method according to Claim 37, wherein:

the generating step includes the step of using a phased array transducer-receiver unit to generate the transmit signal; and

the directing step includes the steps of

i) using the transducer-receiver unit to focus the transmit signal on a focal point in the sample, and

ii) using electrical circuitry in the transducer-receiver unit to move the focal point around the sample.

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42. (New) A method according to Claim 37, wherein said received higher order harmonic components include a second order harmonic component signal, and the forming step includes

the step of forming the image principally from the received second order harmonic component signal.

43. (New) A system for imaging a biological sample, comprising:

means for generating a transmit ultrasonic signal, said transmit signal being at a fundamental frequency and having negligible energy in the second harmonic bandwidth of the fundamental frequency;

means for directing the transmit signal into and along a propagation path in the sample, wherein the sample causes finite, non-linear amplitude distortion of the transmit ultrasonic signal along the propagation path, and said distortion thereby produces a distorted ultrasonic signal comprised of a first order component signal and higher order harmonic component signals at a first and higher order harmonic frequencies respectively, and wherein the sample also reflects the distorted ultrasonic signal including the first order and the higher order harmonic component signals;

means for receiving the higher order harmonic components of the reflected distorted ultrasonic signal produced by the distortion of the initial ultrasonic signal along the propagation path and caused by said sample;

means for forming an image principally from one of said received higher order harmonic component signals; and

means for displaying said formed image.

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44. (New) A system according to Claim 43, wherein the forming means includes:

an analog-to-digital converter for digitizing the received components; and

a processor to process the digitized components to produce an image principally from one of the received harmonic components of the reflected distorted ultrasonic signal.

45. (New) A system according to Claim 44, wherein the forming means further includes a high pass filter for filtering the received harmonic components of the reflected, distorted ultrasonic signal.

46. (New) A system according to Claim 45, wherein the high pass filter filters the received harmonic components of the reflected, distorted ultrasonic signal before the analog-to-digital converter digitizes the received components.

47. (New) A system according to Claim 43 wherein the generating means includes a phased array transducer-receiver unit to generate the transmit signal.

48. (New) A system according to Claim 47, wherein:

the transducer-receiver unit focuses the transmit signal on a focal point in the sample; and

the directing means includes electrical circuitry in the transducer-receiver unit to move the focal point around the sample.

49. (New) A system according to Claim 43, wherein said received higher order harmonic components include a second order harmonic component signal, and the forming means includes means for forming the image principally from the received second order harmonic component signal.

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